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April 16, 1998

To: Tony Berget, Libby Mayor
Libby City Council
Dan Thede, Libby Supervisor of City Services
Rita Windom, Lincoln County Commissioner
Mike Hensler, Montana Fish, Wildlife & Parks
Tim Berry, Morrison Maierle

Fr: Dr. Donald R. Reichmuth, P.E.
President, Geomax, P.C.

Re: FLOWER CREEK AREA INSTABILITY AND
POTENTIAL FOR MAJOR INCREASE IN STREAM SEDIMENT

Introduction and Review of Sediment Trap Condition

On April 7 and 8, 1998 I visited Libby to examine the sediment trap site that Geomax designed and helped build in 1995 on Flower Creek South of the cemetery. On April 7th an on-site inspection was conducted with city, county and Fish & Game representatives. Apparently the trap has been functioning properly as it has filled and been cleaned-out twice and is once again full. It was noted that the upstream grade control structures that control the percentage of flow entering the sediment trap inlet have been modified to make the opening into the trap larger than originally designed. This enlargement will let a higher percentage of flow into the trap channel. Because there is now a dike built around the ponds, the sediment trap channel is actually capable of handling a larger percentage of flood flow than was originally planned. However, it is still possible to re-adjust the flow split ratio in the future by narrowing the entrance into the sediment trap channel, if it is desirable.

Flower Creek Area Deterioration

During the visit to the sediment trap there was considerable discussion concerning the amount of sediment that will be coming down the creek in the future. Several people suggested that I examine the Flower Creek drainage upstream, between the sediment trap and the dam, to assess the present conditions and the potential sediment supply that might be transported downstream. After the meeting a city staff member and I drove up the road that follows Flower Creek. I was shocked to find that the condition of the drainage has deteriorated significantly since I last visited the area in 1995.

The Flower Creek channel cuts through a thick blanket of glacial material that was deposited during the most recent ice ages, which ended approximately 10,000 years ago. Because the creek channel cutting through the glacial deposits is relatively fresh when viewed on a geologic time scale, the valley slopes have not had sufficient time to stabilize and are oversteepened. This leaves the hillsides susceptible to failure by creeping, slumping or sliding.

Evidence of this natural instability is visible in the area. For example, I noticed that there is a bench approximately fifty feet below a flat spot near the radio towers, North of the new water plant. It is very likely that this bench results from an old landslide that was triggered on the oversteepened slopes that surround the flats. The development that has occurred in the drainage (particularly on the flats above the canyon) has greatly increased this natural instability, primarily by discharging additional water to the ground. It is extremely detrimental to add water to these glacial deposits because seepage forces build up that tend to push the valley sides down the hill. Additionally, the water tends to weaken the cementation/cohesion that exists in the deposits and makes the material move easier.

It is clear that the residential septic systems are discharging large quantities of water to the ground. In addition, broken water lines have also added to the problem. As more water continues to penetrate over time, the instability of the slopes can only get worse. More slumps will be triggered and homes along the upper edge will be at risk. The slumps and landslides appear to move downhill quite rapidly, which also creates a dangerous situation for homes that are located at the bottom along Flower Creek. The problem has been made even worse by the logging and road building that has occurred on the steep slope east of Flower Creek. Loss of the trees reduces the stability of the slopes and the new roads provide new paths for water to penetrate the unstable slopes.

Much of the material coming off the slopes will end up in Flower Creek and be transported downstream into the heart of Libby. The existing sediment trap which Geomax designed in 1995 cannot possibly capture the huge overload of sediment that is either entering the system now or likely to be liberated and enter the system in the near future. Significant problems are likely to occur through town. It is even possible that the ground shifting could reach the new water plant and ponds. If this occurred great loss is to be expected.

Recommendations

Introduction of water into these glacial deposits must by controlled and reduced. At a minimum, all homes should be on a central sewer system which eliminates fluid discharge to the ground on the upper flats. Also, further development and landscaping should be controlled to minimize water infiltration.

Action should also be taken to stabilize the existing landslides so additional material is not swept downstream into the heart of Libby. Besides controlling the water infiltration, the stream must be stabilized at the base of the landslides to minimize the potential for wholesale erosion. This should be done immediately. The weight of the material that slides to the bottom of the slope tends to stop further slippage from occurring, unless it is attacked and eroded by the stream. As previously discussed, this material would be carried downstream to cause more problems.

In summary, I found conditions serious and deteriorating. Unless some action is quickly taken, I predict a new set of disasters will strike Libby. Hopefully, the city and county will work together so further problems can be averted.

Respectfully submitted,

Donald R. Reichmuth

Dr. Donald R. Reichmuth, P.E.

FAX COVER SHEET

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Subject: _____ No. Pages (including cover): 4

Message: FYI

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